

The **American Fertilizer**

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JANUARY 20, 1940

No. 2



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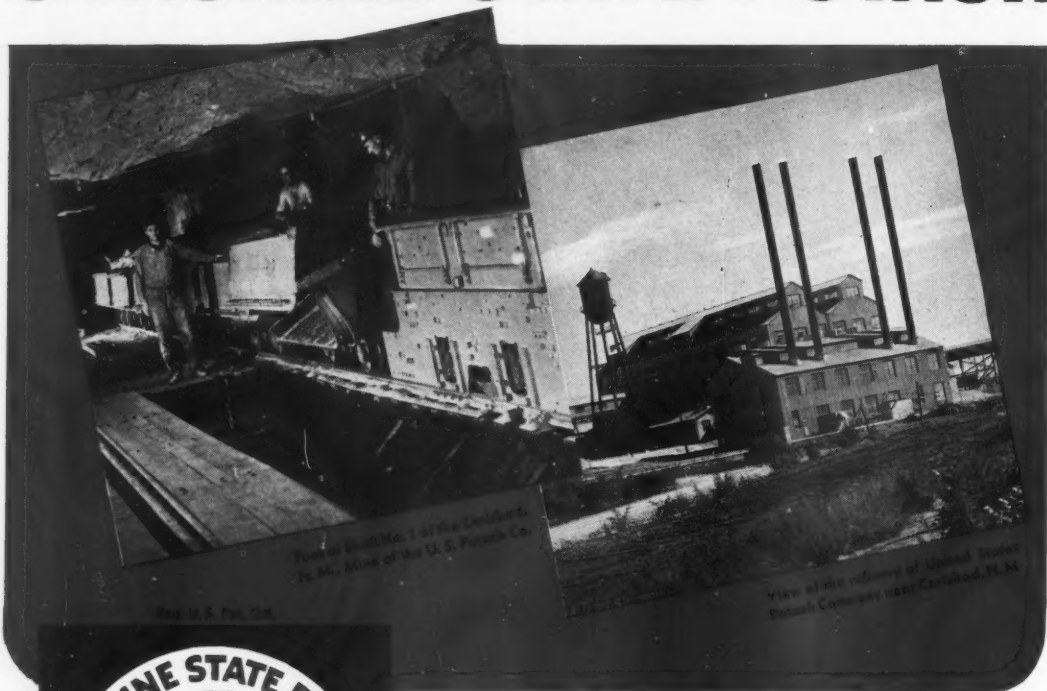
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See Page 21

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AMERICAN FERTILIZER

"That man is a benefactor to his race who makes two blades of grass to grow where but one grew before."

Vol. 92

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The South's Changing Agriculture

By PAUL W. CHAPMAN

Dean, College of Agriculture, The University of Georgia

An Address delivered before The National Fertilizer Association Convention,
Atlanta, November 8, 1939.

(Continued from the January 6, 1940, issue)

Some Immediate Problems

In making changes in the farm economy of the South, many perplexing problems must be solved. In an effort to discover what some of these problems are, I recently conducted a poll in Georgia to ascertain what the people of this state believe to be the farm problems to which immediate consideration should be given. After eliminating those problems not strictly agricultural in character and also those which the farmers of Georgia cannot solve without the assistance of citizens in other parts of the United States, the following list of ten was selected:

1. Low Per Capita Farm Income.
2. Living at Home.
3. Eroded and Impoverished Soil.
4. One-Crop System.
5. Landlord-Tenant Relations.
6. Inadequate Markets.
7. Low Yields Per Acre.
8. Lack of Pastures and Roughage.
9. Land Resources Not Fully Used.
10. Lack of Functioning Farm Organizations.

All of these problems are closely related. One cannot be solved without in some measure contributing to the solution of the other listed. All of the problems in the list of ten, with the possible exception of Living At Home, are closely tied up with the major problem of increasing the Low Per Capita Income.

There are many ways in which the income of the average southern farm can be increased,

but in considering the problems in Georgia the ten following ways of increasing the income of the typical Georgia farm have been suggested:

Ten Ways of Adding to Georgia's Farm Income

1. Increase acres of cropland per person.

Georgia farmers have only one-third as much cropland per person from which to derive a cash income as the farm families of the middle west.

2. Increase yields per acre.

Yields per acre represent an important factor in farm profits. Georgia's yields per acre of the staple crops are approximately two-thirds the national average.

3. Increase sources of income.

Fifty-five per cent of the cash farm income of Georgia during fifteen recent years came from cotton; this is too much to come from any one source.

4. Increase days of labor.

Without livestock and winter crops, few farmers can work enough days in the year to make an income equal to the national average.

5. Increase use of power.

We live in the age of power and machinery. It is the use of power that has made American industry; it is power and machinery that enables the western farmer to produce more per man than any farmer who has ever lived at any period in the world's history.

6. *Improve quality of products.*

Quality and price are correlated; the largest returns come from the best products. There is a quality factor in every product; in cotton it is grade and staple.

7. *Grade and pack properly.*

All products should be graded by U. S. Standards. For all products we should strive for the efficiency in packing and grading attained by the growers of Georgia peaches and apples.

8. *Increase use of land resources.*

We have twice as many acres in Georgia farms as are cultivated. Increase returns from these acres by developing productive, year-round pastures, and by following wise forest management policies in the growing of trees.

9. *Control insects, parasites, and diseases.*

We lost millions of dollars in cash income yearly through failure to control insects, parasites, and diseases. Boll weevils destroy our cotton; parasites reduce the prices paid for our hogs, diseases reduce grain yields by one-third.

10. *Support farm agencies and organizations.*

Farm agencies, services, and organizations are in existence which, if used and supported, can increase the incomes of individual farmers.

These ten ways of increasing the farm income apply equally well to most of the states in the Cotton Belt.

A serious attempt is being made in Georgia to solve these problems. The masses of the people are concerned with the outcome. Our proposed method of attack is that each county in the state will formulate a County Agricultural Program in which they will set up the definite and specific objectives upon which they will concentrate attention.

It is our belief that the people of the South in seeking the attainment of these objectives should use every possible aid available. One important opportunity, it seems to me, has been overlooked. I refer to the full and complete utilization of the soil building assistance provided by the Agricultural Adjustment Administration. There is no state in the Cotton Belt that has used all of the money in any year since the program was initiated. Within the past three years, that is 1936-37-38, there has been a total of more than \$24,000,000 available for the use of the farmers of the southern states for which they have not qualified. This is 34 per cent of the total of \$72,000,000 which has been available. Every state in the South should make a special effort to use all of the money

available for soil conserving payments, and if there is any reason why this program is not practical, then the program should be changed.

Evidence of Progress

In spite of the fact that only about two-thirds of the soil conserving payments available from the Federal government have been used, greater progress has been made in the development of permanent agricultural practices in the years since this program was established than in any period of twice the length of time. Since 1935, the acreage in soil building crops has been increased five times its normal amount. This increase has reflected itself in improvement along all phases of farming.

Diversified agriculture in the South is becoming more pronounced every year. In 1938, there were planted to corn 1,646,000 more acres than in 1937 and the production of 722,270,000 bushels was nearly five million bushels greater than the previous year. In the rest of the country, corn declined 3,595,000 acres and 113,722,000 bushels. Oats similarly, with 488,000 acres and 11,154,000 bushels more in 1938 than in 1937, was in striking contrast to the decline of 267,000 acres and 118,927,000 bushels suffered by the rest of the country.

Among the individual crops which showed an increase in 1938 over 1937 were truck crops which had a total estimated income of \$107,674,000 in 1938, a gain of \$8,512,000 over 1937. Production of peanuts increased 150,170,000 pounds and yielded a cash income of \$39,951,000-\$3,656,000 more than in 1937. Sweet potato production also increased; the 71,488,000 bushels in 1938 was 2,370,000 bushels more than in the previous year.

Perhaps the most encouraging feature of 1938 is the increased number of livestock which reached a total of 62,461,000 valued at 1,546,683,000. This represents a gain of 2,899,000 and \$20,355,000 in number and value respectively. Included in the 1938 figures are 7,926,000 cows and heifers kept for milk and valued at \$313,779,000. In comparison with 1937, this is an increase of 81,000 cows and heifers and an increased value of \$22,342,000.

An increased livestock production is the most evident phase of the South's changing agriculture. In recent years all the major meat packing companies have established plants in the south. A study of the reports of animals slaughtered under Federal inspection in southern packing plants shows that there has been an increase of 67% in cattle; 85% in calves; 376% in sheep and lambs; and 59% in swine since 1920. The greater part of these increases has been made in recent years.

These figures indicate beyond question of a doubt not only that some progress has been made toward the development of new sources of cash income, but that the south is moving in the direction of a wiser type of agriculture which will aid in correcting the devastating result of a system of farming which in the past was devoted too largely to the production of row crops.

Other evidences of progress can be cited. There is no section of the United States which has so long a list of farm products for which it is famous as the south. There has been some expansion in most of the commodities. Within recent years, for example, the canning industry of the State of Florida has expanded to ten times its former volume. Other states have developed industries comparable to the pimento industry of Georgia. All such lines offer attractive yet limited opportunities for development. The new farm program of the South is incorporating a wider variety of enterprises than are produced in any other section of the nation.

A Long-Time Program

If we but realize, however, that we are confronted with the task of establishing something of a new economy in the place of one that has already existed for practically 150 years, we will then recognize that we have a long-time job. A new system cannot be created in a short time.

The attitude of the people of the south in recent years has been most constructive. Let us hope that this attitude is a permanent one and can be sustained until the new program is in full and complete operation.

The changing conditions from time to time may present unfortunate obstacles in attaining the desired goal. I have in mind, of course, the present war in Europe which, if continued long enough, will set up an emergency situation that will temporarily increase the price and demand for cotton and thus contribute to the permanence of an outmoded economy.

I think we should bear in mind that a safe, sane, and balanced farm program in the Southern States is a permanent need. The war in Europe, no matter how long it may last, is temporary. It should be the sincere hope of all persons interested in the welfare of the south and of the nation as a whole that we do not lose sight of the urgent need to solve the persistent problems of the farm people of the Cotton Belt, and that there be established through their efforts a new agricultural economy that will make possible a standard of living to which the nation as a whole may point with pride.

Fertilizers—An Essential Industry

I wish to congratulate those persons engaged in the fertilizer industry upon the opportunity which is theirs to render an essential service.

For those in many fields of work, in this period of rapid changes, it is a constant and ever-present fear that scientific advance will render their work less important, or even obsolete. Such is not the case with the commercial fertilizer industry. It will grow more important with the years.

From the modest sales of approximately 125,000 tons of fertilizer used in the United States in 1860, the industry has gone forward until the sales of 1938 exceeded 7,500,000 tons. It will continue to increase in the years that lie ahead.

The minute that man, in prehistoric ages, first disturbed the balance of Nature, the urgent need for commercial plant food was initiated. It has been increasing in the United States from the day the first settlers planted a crop. It will increase in the future in spite of anything that can be done. The farmers of Holland use about twenty times as much fertilizer per acre as is used in the United States. While we may never use so much unless our population grows far beyond present estimates, we will move in fertilizer consumption nearer and nearer to the average applied in the European nations.

There are a few persons in the fertilizer business in the Southeast, I fear, who are inclined to believe that the present efforts to stimulate the universal practice of soil conserving methods is likely to decrease the use of commercial fertilizers. This, in my opinion, will not and should not follow the acceptance of these wise farming practices. On the contrary, such methods will make possible larger net returns to the farmers who buy commercial plant food. And, in the final analysis, sales will and should be correlated with net profits to the farmer.

Fertilizer men look with apprehension upon the decreasing cotton acreage in the South, for this has always been the crop to which the major part of the fertilizer has been applied in the more important cotton-growing states, especially those in the Southeast. But changes made in the system of farming in these states need not and should not lead to reduced ferti-

(Continued on page 26)

Urea as a Source of Nitrogen for Potatoes in the Hastings Area*

By R. V. ALLISON

Department of Chemistry and Soils, Florida Agricultural Experiment Station, Gainesville, Fla.

POTATO fertilizer experiments affording direct comparison of certain nitrogen sources and combinations of sources in a complete fertilizer were conducted in the Hastings area through the three seasons, 1936-1939. The tests were carried out on typical soils of the region, Bladen fine sand and fine sandy loam for the most part. One series of plots was located on Portsmouth fine sand. Methods of planting and cultural treatments were essentially those of the grower-cooperators in whose fields the plantings were located.

In comparing the limited number of nitrogen sources involved in the study, a 5-7-6 fertilizer mixture was used throughout at the rate of 2,000 pounds per acre. The essential variations in the four different mixtures used in the tests are shown in the table attached. Phosphoric acid for all mixtures was derived from superphosphate and potash was sup-

plied as equal parts from the muriate and sulphate forms. Dolomite was included at the rate of 150 pounds per ton.

All trials included comparison with a supplementary treatment involving manganese, zinc, and boron as a check against soil exhaustion in terms of these elements when synthetic forms of nitrogen are used. The actual number of plots or replications of each mixture for each year is indicated in the table. The more specific results of the study may be summarized as follows:

1. Fifty per cent of the nitrogen in a mixed fertilizer for potatoes may be derived from urea instead of from natural organic sources when the other half is supplied by a combination of nitrate of soda (15 per cent) and sulphate of ammonia (35 per cent), without appreciably affecting the yield.

2. The use of natural organics as 20 per cent of the nitrogen source when the balance of this element was supplied by a mixture of equal parts of urea and sulphate of ammonia

* Briefed from a more extended report by B. W. Hundertmark and R. V. Allison, Department of Chemistry and Soils, University of Florida, in the American Potato Journal for December, 1939.

Summary of Average Potato Yields for Each Treatment of All Experiments for the Three Seasons, 1936-1937 to 1938-1939

Treatment		Total Yields in Bushels per Acre (No. 1 Tubers)								
		Season 1936-37 (24 Replications)		Season 1937-38 (17 Replications)		Season 1938-39 (6 Replications)		Averages		General Average
		Without Supplem't	With† Supplem't	Without Supplem't	With† Supplem't	Without Supplem't	With† Supplem't	Without Supplem't	With† Supplem't	
No. 1										
50%	Insoluble organic*	135.9	134.9	170.3	172.8	137.5	130.8	148.4	147.8	148.1
15%	Nitrate of soda	(81.5)‡	(81.6)	(86.0)	(86.2)	(84.1)	(81.3)			
35%	Sulphate of ammonia									
No. 2										
50%	Urea	137.4	128.9	170.8	176.6	131.4	140.3	148.5	147.6	148.1
15%	Nitrate of soda	(81.2)	(80.7)	(86.4)	(87.1)	(82.6)	(83.7)			
35%	Sulphate of ammonia									
No. 3										
50%	Urea	140.8	150.8	163.0	160.3	129.2	133.0	147.1	151.4	149.3
50%	Sulphate of ammonia	(81.1)	(87.5)	(88.7)	(86.0)	(81.9)	(81.3)			
No. 4										
20%	Insoluble organic*	141.5	130.7	161.7	174.3	129.6	133.9	147.0	147.4	147.2
40%	Urea	(81.6)	(80.7)	(85.2)	(86.2)	(81.6)	(82.4)			
40%	Sulphate of ammonia									

* The natural organic nitrogen was derived in equal amounts from fish meal, cottonseed meal and high-grade animal tankage.

† During the 1936-37 season the supplement consisted of sulfate of copper, manganese and zinc at the rate of 25 pounds of each per acre and of borax at 10 pounds per acre. Subsequently copper was omitted and the borax application reduced to 5 pounds per acre.

‡ Percentage of No. 1 tubers in the total yield.

(Mixture No. 4) did not affect the yield of tubers as compared either with the check treatment (No. 1) or the all-urea mixtures (No. 2 and 3), though it did favorably influence the physical condition and drillability of the mixture.

3. No stimulation in growth of vine or consistent increase in yields of tubers could be attributed to the use of a mineral supplement consisting of manganese, zinc, and boron.

The result of these tests appear to point to a rather definite saving that might be effected in fertilizer costs for potatoes in the Hastings area through a judicious use of urea as a partial source of nitrogen. The chief arguments for this conclusion are the complete support of yield this material has shown, together with the lower net cost per unit of nitrogen which it affords.

Supplementary observations and study seemed to show that a suboptimum water supply is rather commonly the limiting factor in potato production in the Hastings area. From the records of weather and crop performance, it appears that most importance is to be attached to the rainfall in April unless satisfactory irrigation facilities are available. In the preliminary tests referred to, irrigation showed very striking results. This emphasizes the importance of considering the adequacy of the water supply in the soil and its distribution through the season before undertaking to improve the yield of potatoes alone through the use of greater quantities of fertilizers.

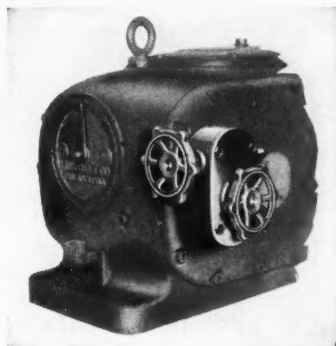
LINK-BELT (VERNIER CONTROL) VARIABLE SPEED TRANSMISSION

Announcement is made by Link-Belt Company, Philadelphia, that it is now in position to equip all sizes of the Link-Belt P. I. V. Gear variable speed transmission with vernier control for installations where extremely fine control of speed changes is required.

This vernier control can be supplied with either one of two ratios— $7\frac{1}{2}$ to 1 or 30 to 1, and is equipped with two hand wheels. One is for direct control; the secondary, or vernier type control hand wheel will provide either 30 turns or $7\frac{1}{2}$ turns to one of the direct wheel, depending upon which ratio of worm-gear reduction set is furnished.

As vernier control is said to provide the fine sensitivity required for true micrometer adjustments of speed, the manufacturers are particularly recommending it for such services as

synchronizing the speeds of two machines; justifying for shrinkage and expansion of such products as textiles and paper; controlling feeders; on weighing operations; obtaining exact register; controlling the overlay of



wirecovering on wire-producing machinery; or wherever the uniformity of a product can be assured by such close speed regulation.

Link-Belt Company 40-page Book No. 1574, covering vernier and other types of P. I. V. Gear control, will be sent to any reader upon request addressed to the company at 2045 W. Hunting Park Ave., Philadelphia.

SODIUM NITRATE POSITION IN CHILE

Production of sodium nitrate in Chile during the fiscal year ended June 30, 1939, was approximately the same as in the previous season, although exports increased 2.8 per cent. Sales for the past 3 seasons have shown practically no change. On the other hand, the stock situation has been steadily improving, the supply on hand on June 30, 1939, having amounted to 53 per cent of the quantity on June 30, 1934.

The stocks of "shanks" nitrate which were on hand at the time of formation of the Chilean Nitrate and Iodine Sales Corporation, should be completely liquidated during the 1940-41 nitrate year, which is the basic cause for the production increase noted in the seasons following that of 1936-37.

Season	Production	Metric Tons—	
		Exports	Stocks*
1933-34.....	529,877	1,182,393	1,768,261
1934-35.....	1,135,546	1,270,964	1,629,367
1935-36.....	1,216,347	1,342,019	1,499,714
1936-37.....	1,290,276	1,499,830	1,228,454
1937-38.....	1,420,312	1,544,001	1,070,658
1938-39.....	1,427,472	1,586,915	941,102

* At the end of fiscal year.

Tax Tag Sales in 1939

TOTAL fertilizer consumption in 1939 in 17 Southern and Midwestern States, as indicated by the sale of tax tags, amounted to 5,417,789 tons, according to the tabulation made by The National Fertilizer Association on the basis of reports by state control officials. This was 3 per cent above the 5,263,271 tons reported for 1938 and 7 per cent below 1937. With the exception of 1937, it was the largest tonnage reported for any year since 1930.

Sales in December were moderately below last year, with six states in the South and three in the Midwest reporting declines. With the exception of Florida, tags purchased in December are used to a large extent in the following calendar year and do not represent current consumption. Year-to-year changes in December are likely to be erratic and not particularly significant. This is especially true in the Midwest, where December sales are usually at the year's low point.

Increases from the year 1938 to 1939 were reported by nine of the twelve Southern States, with the largest percentage gains occurring in North Carolina and Texas. The most important decline was in Georgia, where there was a drop of 79,000 tons. Smaller declines took place in Mississippi and Oklahoma.

Although total tonnage in the South in 1939 was 8 per cent below 1937, increases between those two years were shown in the west south central region—Arkansas, Louisiana, Texas, and Oklahoma. Recovery in the entire post-depression period in this region has been less than in the rest of the South.

Three of the five reporting Midwestern States showed larger tag sales in 1939 than in 1938, with the net increase for the region amounting to 3 per cent. The third consecutive annual decline occurred in Missouri sales. Kansas registered a drop from the 1938 peak Kentucky sales went above 1937.

FERTILIZER TAX TAG SALES*

(Compiled by The National Fertilizer Association)

	December			January-December		
	1939 Per Cent of 1938	1939 Tons	1938 Tons	1939 Per Cent of 1938	1939 Tons	1938 Tons
SOUTH:						
Virginia†	111	8,312	7,487	103	418,089	405,179
N. Carolina	82	47,101	57,318	110	1,215,887	1,104,788
S. Carolina	88	15,340	17,513	103	678,859	660,963
Georgia	45	11,153	24,916	90	689,790	768,323
Florida†**	101	78,677	78,264	100	556,782	555,475
Alabama	325	8,450	2,600	106	562,100	528,850
Mississippi	44	8,365	18,950	98	318,761	325,836
Tennessee†	...	0	42	102	130,354	128,291
Arkansas†	39	900	2,300	109	74,122	67,800
Louisiana†	120	4,800	4,000	108	160,488	148,542
Texas†	112	4,244	3,790	113	95,226	84,276
Oklahoma	...	600	0	95	7,622	8,005
Total South	87	187,942	217,180	103	4,908,080	4,786,328
MIDWEST:						
Indiana	256	625	244	112	263,145	235,297
Illinois	71	750	1,061	103	44,456	43,278
Kentucky	...	0	324	109	120,009	109,968
Missouri	82	177	217	96	67,733	70,301
Kansas	350	70	20	79	14,366	18,099
Total Midwest	87	1,622	1,866	107	509,709	476,943
Grand Total	87	189,564	219,046	103	5,417,789	5,263,271

* Monthly records of fertilizer tax tags are kept by state control officials and may be slightly larger or smaller than the actual sales of fertilizer. The figures indicate the equivalent number of short tons of fertilizer represented by the tax tags purchased and required by law to be attached to each bag of fertilizer sold in the various states.

† Cottonseed meal sold as fertilizer included.

‡ Excludes 61,000 tons of cottonseed meal for January-December combined, but no separation is available for the amount of meal used as fertilizer from that used as feed.

** Includes 78,127 tons of phosphatic and lime materials for January-December.

As shown by the tabulation, 1939 tag sales in the Midwest were well above the depression level while sales in the South are still below 1928-1930. The trend of fertilizer consumption in the newer fertilizer-using areas is still upward, while leveled off in the South.

It seems likely that total fertilizer consumption in the entire country was between 7,700,000 and 7,800,000 tons in 1939. This represents a moderate gain over 1938, though well under the 1937 peak. Government forecasts indicate that farm prices and income will be

higher this spring than a year ago. If past relationships continue, this would result in an increase in spring fertilizer tonnage.

HOCKLEY HEADS COMMITTEE

Chester F. Hockley, president of the Davison Chemical Corporation, has been appointed chairman of the Modern Pioneers' Committee. This committee will have charge of the Maryland celebration in connection with the 150th anniversary of the establishment of the American patent system.

Tax Tag Sales, Based on the 1928-30 Average as 100

	1928-30	1931	1932	1933	1934	1935	1936	1937	1938	1939
South	100	74	48	57	65	72	78	97	87	89
Midwest	100	78	40	46	64	79	106	118	104	112

Fertilizer Tax Tag Sales in 1939

Month	Va.	N. C.	S. C.	Ga.	Fla.	Ala.
January	39,007	132,355	52,436	36,269	70,308	35,950
February	52,512	143,926	92,775	96,454	52,649	65,950
March	87,674	358,252	266,468	322,062	45,032	199,700
April	90,905	371,434	173,192	160,368	20,911	195,800
May	31,302	69,414	35,864	42,997	57,322	40,040
June	11,252	24,639	14,179	6,024	18,581	7,010
July	4,776	4,862	1,475	570	19,986	2,200
August	12,199	4,073	2,525	1,458	18,697	650
September	54,263	24,439	6,130	5,310	41,999	1,850
October	22,457	28,637	11,890	1,100	64,936	1,450
November	3,430	6,755	6,585	6,025	67,684	3,050
December	8,312	47,101	15,340	11,153	78,677	8,450
Year	418,089	1,215,887	678,859	689,790	556,782	562,100

Month	Miss.	Tenn.	Ark.	La.	Tex.	Okla.
January	19,150	2,705	14,550	20,800	13,025	2,250
February	46,625	20,506	12,050	27,250	16,620	1,679
March	73,825	24,250	24,300	45,000	29,389	2,089
April	117,775	44,493	12,000	27,751	17,640	10
May	7,488	21,961	1,200	1,075	3,495	155
June	733	1,170	772	1,600	205	15
July	12,050	1,234	100	102	360	200
August	200	360	400	2,150	275	5
September	0	1,120	250	11,460	7,328	264
October	22,125	12,545	6,400	17,100	1,070	355
November	10,425	10	1,200	1,400	1,575	0
December	8,365	0	900	4,800	4,244	600
Year	318,761	130,354	74,122	160,488	95,226	7,622

Month	Ind.	Ill.	Ky.	Mo.	Kan.	17 States
January	6,419	1,278	3,423	1,176	180	451,281
February	29,394	5,916	16,000	3,934	525	684,765
March	58,482	8,832	21,585	13,655	610	1,581,205
April	17,313	3,862	20,815	2,062	5	1,276,336
May	45,050	9,687	23,758	39	135	390,982
June	656	0	6,975	2	0	93,813
July	3,500	150	0	65	0	51,630
August	67,694	7,362	9,550	21,084	7,171	155,853
September	28,450	2,550	9,123	22,064	5,440	222,040
October	5,500	4,032	6,813	3,475	230	210,115
November	62	37	1,967	0	0	110,205
December	625	750	0	177	70	189,564
Year	263,145	44,456	120,009	67,733	14,366	5,417,789

THE AMERICAN FERTILIZER

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INDUSTRY AND ITS ALLIED INDUSTRIES

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FERTILIZER EXPORTS AND IMPORTS DECLINE

The effect of the war in Europe is being distinctly felt on both exports and imports of fertilizer materials. During November, 1939, exports totaled 79,270 long tons, a drop of 46 per cent from the figures for November, 1938. Nitrogenous materials declined from 20,207 tons in November, 1938, to 7,538 tons in November, 1939. Phosphate rock shipments dropped from 107,760 tons to 45,822 tons. Potash materials, on the other hand, showed increased exports of 12,751 tons, compared with 3,080 tons.

On the import side, a marked increase in nitrate of soda shipments, which totaled 66,407 tons, was offset by a decline in imports of potash materials from 58,730 tons in November, 1938, to 4,214 tons in November, 1939. Total fertilizer imports came to 109,391 tons in November, 1939, a slight drop from the 114,164 tons imported in November, 1938.

During the first eleven months of the year, exports dropped from 1,435,160 tons in 1938 to 1,324,161 tons in 1939, while imports showed the same proportional decline, from 1,406,645 tons in 1938 to 1,316,334 tons in 1939. In the export field shipments of phosphate rock dropped about 130,000 tons while potash exports increased about 45,000 tons. The loss in imports was confined to the potash classification, the drop being 120,000 tons, due to the war.

COALE ELECTED PRESIDENT OF J. P. THOMAS & SON CO

At the annual meeting of J. P. Thomas & Son Company, of Camden, N. J., James S. Coale was elected to the office of president, to succeed the late Henry H. Lippincott. The other officers elected were Raymond R. Hall, vice-president in charge of manufacturing; I. Preston Thomas, vice-president in charge of sales; S. Robinson Coale, treasurer; Heulings Lippincott, secretary; Walter C. George, comptroller.

BROWN NOW VICE-PRESIDENT OF FEDERAL CHEMICAL CO.

A. E. Sheldon, president of Federal Chemical Company, Louisville, Ky., has announced the election of Claude T. Brown to the office of vice-president in charge of sales and purchases. Mr. Brown, who was formerly assistant sales manager, succeeds Arthur S. Key, who died on January 14th.

Prospective Increased Use of Fertilizer on Potatoes

One of the most important fertilizer-using crops in the United States is potatoes, accounting for an estimated 7.6 per cent of all the fertilizer used. The rate of application is heavy, perhaps averaging over a half ton per acre. The percentage of acreage fertilized is high in most areas.

Economic factors indicate an increase in potato acreage this year and an increase in the amount of fertilizer used. The U. S. Department of Agriculture has forecast that 1940 acreage will exceed that of 1939 by 100,000 acres. Most of the increase will likely occur in states where fertilizer is generally used.

The average price received per bushel for the 1939 crop was well above 1938. The current price is above a year ago. In view of the prospective continued rise in consumer incomes potato prices should remain at a fairly satisfactory level in 1940. Fertilizer prices will be comparatively low in relation to prices farmers receive. Price relationships, therefore, are favorable to a larger tonnage of fertilizer for the potato crop.

Pertinent information about the use of fertilizer on potatoes for the important states are given in the following tabulation. The data are based on Government reports and our Consumer Survey.

Obituary

ARTHUR S. KEY

The fertilizer industry has lost another of its leading executives by the death on January 14th of Arthur S. Key, Vice-President of the Federal Chemical Company, Louisville, Ky. Mr. Key was stricken with a cerebral hemorrhage on December 26th and, although recovery seemed remote, his exceptionally strong constitution enabled him to survive for over two weeks longer. Funeral services were held on January 16th. Mr. Key was 51 years of age at the time of his death.

Mr. Key served as secretary of the Federal Chemical Company for about 18 years until his election last spring to the office of vice-president in charge of sales, succeeding the late Wood Crady. He had always taken an active part in the affairs of the industry, having served for many years on the Traffic Committee of The National Fertilizer Association. At the convention in June, 1939, he was honored by election to the Board of Directors of the Association.

He is survived by his wife, Mrs. Evelyn K. Key, to whom the sincere sympathy of the industry is extended.

The Use of Fertilizer on Potatoes and Its Economic Effect

State	Potato Acreage 1939 (000)	Tons of Fertilizer Used on Potatoes 1938	—Estimated Yields— Without Fertilizer With Fertilizer		Pounds of Fertilizer Applied per Acre	Bus. of Potatoes Produced by 1 Ton of Fertilizer	Value of Increased Yields per Dollar Spent for Fertilizer
Me.	170	117,000	97	294	1,643	240	\$2.90
Mass.	17	12,000	79	239	1,584	202	2.32
Conn.	17	10,000	85	234	1,394	214	3.32
N. Y.	209	66,000	107	214	947	226	2.55
Pa.	189	45,000	138	240	651	313	3.78
N. J.	56	47,000	61	199	1,783	155	2.52
Del.	4	2,000	54	147	1,167	159	1.86
Md.	25	14,000	62	173	1,352	164	2.18
W. Va.	31	5,500	104	177	759	192	2.51
Va.	79	46,000	39	146	1,603	133	2.51
N. C.	87	42,000	57	157	1,082	185	3.97
S. C.	28	13,500	42	163	1,152	210	4.07
Ga.	19	5,000	33	98	632	206	3.38
Fla.	29	26,500	4	143	1,568	177	3.64
Ala.	44	21,000	26	117	1,320	138	2.58
Miss.	19	2,600	49	162	492	459	5.47
Ark.	37	2,900	54	103	544	180	3.49
La.	42	8,000	55	110	379	290	4.05
Tex.	43	5,000	56	111	434	253	3.41
Ohio	118	20,000	110	169	575	205	3.04
Mich.	265	20,000	122	177	417	264	3.62
Ind.	52	4,000	133	203	294	476	4.15
Cal.	74	16,000	137	249	648	346	5.06

FRENCH POTASH APPOINTS SECTIONAL AGENTS

The French Potash Company, which was organized recently to handle the U. S. sales of potash from the French mines, has announced the appointment of sectional representatives to handle sales in various parts of the fertilizer-using territory. The Baltimore office in the First National Bank Building will be in charge of K. D. Morrison. The Atlanta territory will be handled by J. DeWitt Toll, Jr., with offices in the Hurt Building. William Lehmann will head the Montgomery, Ala., office at 1501 South Hull Street. Offices at Orland, Fla., and Fitzgerald, Ga., will be in charge of J. L. Baskin and C. W. Collier, respectively. The head offices of the company are located at 30 Rockefeller Plaza, New York City.

GERMAN PHOTO-ELECTRIC SOIL TEST DEVELOPED

A national program has been developed in Germany for the systematic testing of soil by new photo-electric methods with a view to the more effective use of fertilizer for expanding soil productivity to maximum levels. The program provides for each of the 70 agricultural experimental stations situated throughout Germany conducting initially 25,000 soil tests annually, the number to be increased to 100,000 annually per station as the program becomes well established. It is expected that it will be possible to rationalize the application of commercial fertilizer in accordance with the ascertained fertility of the soil and in this manner further increase the productivity of German farm land.

The conducting of soil-analysis tests upon such a large scale is said to be possible through the recent development of simple, inexpensive

but highly accurate testing methods by photo-electric means based upon the use of photo-electric cells and principles of spectral analysis. Tests can be carried out rapidly by trained workers and there is no need for tedious methods of chemical analysis requiring the services of scientifically trained personnel.

German consumption of fertilizer has risen markedly in recent years under the stimulus of the national campaign for maximum crop yields, as shown by an increase (Old Reich, excluding Austria and other annexed territories) for nitrogenous fertilizers, from 383,000 metric tons N in 1933-34 to 633,000 tons N in 1937-38; for potash from 718,000 to 1,156,000 tons K_2O , and for phosphoric acid from 471,000 to 690,000 metric tons P_2O_5 . However, it is felt that, for achieving maximum crop results, it will be necessary to still further expand the nation's fertilizer consumption to annual levels of 1,162,000 metric tons for nitrogen, 1,021,000 tons for phosphoric acid and 1,842,000 tons for potash; equivalent to an increase above 1937-38 levels of almost 90 per cent for nitrogen, almost 50 per cent for phosphoric acid and 60 per cent for potash.

MIDWEST FERTILIZER FREIGHT RATES ATTACKED

Two complaints have been filed with the Interstate Commerce Commission by the Davison Chemical Corporation and the F. S. Royster Guano Company, attacking the carload freight rates on fertilizer in the Central Freight Association territory, in which the complainants operate five plants. They claim that the increase in freight rates made on December 20, 1937, which range up to 15 per cent, are unreasonable and should be lowered.

BRADLEY & BAKER

FERTILIZER MATERIALS - FEEDSTUFFS

AGENTS - IMPORTERS - BROKERS

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505 Barnett Bank Building
Jacksonville, Fla.

FERTILIZER MATERIALS MARKET

NEW YORK

Market Continues Dull. Exports Do Not Show Expected Rise. Better Supplies of Sulphate of Ammonia. Fish Meal Scarce.

Exclusive Correspondence to "The American Fertilizer."

NEW YORK, January 16, 1940.

Continued dullness prevails in both the chemical and organic fertilizer materials markets and no increase in activity is indicated for the near future. Price structures in general are unchanged over recent weeks, with all markets firm.

Contrary to early expectations, figures recently released by the Bureau of Foreign and Domestic Commerce reveal that total exports of fertilizer materials during November, 1939, were less than during the same period of 1938. Although exports of potash show an increase in November, 1939, of four times the amount exported in November, 1938, it is noted that the decline in the complete total was caused by the decrease in phosphate shipments abroad. With European supplies cut off, the anticipated demand on our market has not reached the predicted proportions, probably because the need for raw fertilizer materials has not been urgent up to now in the Latin American countries and in the Orient. If the present war conditions are prolonged, it is felt that more activity will develop in this direction.

Nitrate of Soda

Remains unchanged, with normal seasonal activity noted.

Sulphate of Ammonia

This market is firm at the \$28.00 scheduled price, with little buying activity. Supplies are slowly increasing and current demands are being well taken care of.

Superphosphate

No changes in price and there is plenty of both ordinary and triple superphosphate to take care of present domestic consumption.

Potash

This market remains strong at the scheduled price. There is now an abundant supply of

material available as both the German and French producers are shipping regularly to this market.

Dried Blood

The last confirmed domestic sale was at \$3.45 (\$4.19½ per unit N). Offerings of domestic material are light and held at \$3.50 (4.25½ per unit N) with buyers seemingly out of the market for the moment. South American material is offered at \$3.50 (\$4.25½ per unit N), but no buying interest is shown.

Tankage

This market rules easy and the 8/9 per cent grade is being offered at \$3.50 (\$4.25½ per unit N) and 10 cents with no interest of any account. 11/12 per cent material is offered at \$3.65 (\$4.43½ per unit N) and 10 cents, but bids from buyers are lacking. Small amounts of South American 8/9 per cent material are being quoted at \$3.70 (\$4.49½ per unit N) and 10 cents.

Bone Meal

Still no supplies from Europe available. South American raw bone meal is obtainable in limited quantities at \$29.50 c.i.f. Atlantic coast ports, but buying interest is dull.

Nitrogenous Material

This market is very sluggish and last business reported was done at \$2.50 (\$3.04 per unit N) seaboard basis.

Fish Scrap

Very little menhaden scrap is now available and the quantities that are offered are in strong hands. Menhaden meal is currently quoted at \$57.00, Baltimore. Japanese sardine meal continues to be offered at \$51.50, Atlantic coast ports.

A Complete Service

THE strategic factory locations of the American Agricultural Chemical Company, as shown on the accompanying map, assure prompt, dependable service for the complete line of products listed below.

We manufacture all grades of Commercial Fertilizers, Superphosphate, Agrinite Tankage, Bone Black, Bone Black Pigments (Cosmic Black), Dicalcium Phosphate, Monocalcium Phosphate, Gelatin, Glue, Ground Limestone, Crushed Stone, Agricultural Insecticides (including Pyrox, Arsenate of Lead, Calcium Arsenate, etc.), Trisodium and Disodium Phosphate, Phosphorus, Phosphoric Acid, Sulphuric Acid, Salt Cake, and we are importers and/or dealers in Nitrate of Soda, Cyanamid, Potash Salts, Sulphate of Ammonia, Raw Bone Meal, Steamed Bone Meal, Sheep and Goat Manure, Fish, Blood and Tin-Tetrachloride. We mine and sell all grades of Florida Pebble Phosphate Rock.



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Buffalo, N. Y.	East St. Louis, Ill.	Presque Isle, Me.
Carteret, N. J.	Greensboro, N. C.	Savannah, Ga.
Cayce, S. C.	Henderson, N. C.	Searsport, Maine
Chambly Canton,	Montgomery, Ala.	South Amboy, N. J.
Quebec, Can.	Norfolk, Va.	Spartanburg, S. C.
Charleston, S. C.	No. Weymouth, Mass.	West Haven, Conn.
Cincinnati, Ohio	Pensacola, Fla.	Wilmington, N. C.
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Buffalo, N. Y.	East Point, Ga.	Montreal, Quebec,	Port Hope, Ont.
Carteret, N. J.	East St. Louis, Ill.	Can.	Savannah, Ga.
Charleston, S. C.	Greensboro, N. C.	New York, N. Y.	Spartanburg, S. C.
Cincinnati, Ohio	Henderson, N. C.	Norfolk, Va.	Wilmington, N. C.
Cleveland, Ohio	Houlton, Me.	No. Weymouth, Mass.	Havana, Cuba

MENTION "THE AMERICAN FERTILIZER" WHEN WRITING TO ADVERTISERS.

BALTIMORE

Little Interest in Materials at Present but Prices Remain Firm. Slight Drop in Bag Prices.

Exclusive Correspondence to "The American Fertilizer."

BALTIMORE, January 16, 1940.

There has not been any change in conditions during the past two weeks as far as interest in fertilizer materials is concerned. In spite of the lack of interest, however, the market on materials remains firm with practically no changes.

Ammoniates.—Tankage suitable for feeding purposes is nominally \$4.40 per unit of nitrogen and 10 cents per unit of B. P. L., f.o.b. Baltimore. As this is so much higher than fertilizer manufacturers can afford to pay, there is very little fertilizer tankage being made.

Nitrogenous Material.—There has been practically no activity in this commodity and the price remains unchanged at around \$3.35 per unit of nitrogen, c.i.f. Baltimore, for the foreign product.

Sulphate of Ammonia.—January price of \$28.00 per ton of 2,000 lb. is now effective, and this figure will prevail with first hands through June. Most of the manufacturers have anticipated their requirements as much as possible in order to secure the benefit of the lower prices which prevailed for early deliveries, and as the production has materially increased as compared with the same period last year, there should be ample stocks to go around, with little prospect of any market changes unless the export demand becomes more active.

Nitrate of Soda.—The between-season lull is now on as far as deliveries of this material are concerned, and until the shipping season in this section gets under way, there will be very little movement in nitrate of soda, which is rul-

ing firm at \$29.00 per ton of 2,000 lb., in bags, f.o.b. port warehouse, with usual differential in 200-lb. bags and bulk.

Fish Meal.—This material guaranteed 55 per cent protein remains firm in sympathy with the stronger tendency of meat meal, and the market ranges from \$58.00 to \$59.00 per ton of 2,000 lb., in bags, f.o.b. Baltimore.

Superphosphate.—Deliveries are now being made against contracts previously booked, and no heavy stocks are accumulating in the hands of manufacturers. The present market, subject to change without notice, is \$8.50 per ton of 2,000 lb., basis 16 per cent for run-of-pile, and \$9.00 per ton of 2,000 lb. for flat 16 per cent grade, both in bulk, f.o.b. Baltimore.

Potash.—With imported potash now being offered by two different companies who are getting shipments through fairly regularly, it would now appear that stocks will be ample to take care of normal requirements. Domestic producers are increasing their production right along, and prices remain firm on the basis of schedule previously announced.

Bone Meal.—All buyers have now covered for their normal requirements, and there will be very little buying interest shown in further supplies until the spring season is well under way. The nominal market on domestic 3 and 50 per cent steamed bone meal ranges from \$32.00 to \$36.00 per ton, while 4½ and 50 per cent South American raw bone meal is priced at \$30.00 to \$32.00 per ton of 2,000 lb., c.i.f. Baltimore.

Bags.—The market on burlap has again eased off, and the present price of plain, new, 10-oz. burlap bags for spring delivery is about \$156.00 per thousand, basis 40 cut 54 in., delivered Baltimore, but with no buying interest manifested on this basis.

Manufacturers' Sales Agents for **DOMESTIC**

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::

Anhydrous Ammonia

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ATLANTA

Market More Active after Holidays. Prices More Favorable after Fall Flurry.

Exclusive Correspondence to "The American Fertilizer."

ATLANTA, January 16, 1940.

Following the holiday season there has been a temporary lull in the market on various fertilizer materials, but even now interest is beginning to pick up.

Prices generally are still in a very favorable buying range and, fortunately for buyers in this country, the influence of the war in Europe has by no means forced prices to exorbitant levels. As a matter of fact, since the spurt in September, commodities for the most part have settled down to levels that should be attractive to anyone who has additional purchases to make.

The markets are as follows:

Tankage.—Fertilizer grade, \$3.50 (\$4.25½ per unit N) and 10 cents, Chicago; South American, \$3.70 (\$4.49½ per unit N) and 10 cents, c.i.f.

Blood.—Domestic, \$3.90 (\$4.74 per unit N), Chicago; imported, \$3.50 (\$4.25½ per unit N), c.i.f.

Nitrogenous.—Domestic, \$2.00 (\$2.43 per unit N), western producing points; imported, \$2.65 (\$3.22 per unit N), c.i.f.

Fish Meal.—Imported, \$54.00, ex vessel southern ports; menhaden, \$53.00, producing points.

Nitrate of Soda.—Demand picking up with no change in price.

Sulphate of Ammonia.—Spot supplies limited with good export demand but no shortage for season in sight yet.

Raw Bone Meal.—4½ and 45 per cent, \$27.50, c.i.f.

Steam Bone Meal.—3 and 50 per cent, \$27.00, c.i.f.

Cottonseed Meal.—\$30.00, Memphis; southeastern mills, \$2.00 per ton higher.

TENNESSEE PHOSPHATE

Shipments Continue in Volume in Spite of Price Advances. Tobacco Market Disappointing.

Exclusive Correspondence to "The American Fertilizer."

COLUMBIA, TENN., January 15, 1940.

Notwithstanding the fact that January 1st brought with it a decided strengthening of all market quotations and prices paid in all types of phosphate rock, shipments have held up remarkably well in all lines, contrary to the usual falling off experienced at this season, though, of course, not up to the peak tonnages of September and October.

Outside mining has been fraught with considerable difficulty, owing to an unusual period of cold weather, ushered in with a heavy snowfall on December 31st, followed by twelve days during which the thermometer did not get above freezing except in the middle of one or two days, and low temperatures of from 4 above to 4 below were recorded at many points.

The snow stayed on the ground longer than has been known for some time and, being followed the last two days by heavy rains, the long suffering small grain crops and pastures are receiving welcome relief from the drought which had been experienced all fall and early winter.

The tobacco crop was cut both as to yield and quality by the adverse weather conditions and the sales just about completed were disappointing compared with usual conditions in



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Urea Nitrogen Is Quickly Available and Stays Put!

UREA NITROGEN becomes available to crops even in a relatively dry soil. Numerous investigators also report that urea nitrogen is resistant to the leaching action of rains. They have shown that urea goes to work quickly and keeps working, whether the season is wet or dry—in rain or shine. For instance, Maine Agricultural Experiment Station Bulletin 134, in reporting results of experiments with nitrogen fertilizers for potatoes covering six years, says, "Urea gave the largest yields (averaging 313 bushels or 114 barrels per acre), which speaks well for this fertilizer material." The report points

out that the highest yields, 313 bushels, were secured with urea. The data show that the urea plot was the highest yielding plot in 1 dry year and in 3 years "when the rainfall was sufficient to cause serious leaching."

Urea Nitrogen is ideally suited for your "rain-or-shine fertilizers." It is:

1. Completely available
2. Resistant to leaching and . . .
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this high phosphate soil area, but compared with crop in other regions, the object lesson still holds good that tobacco fertilizers need large percentages of phosphorus for best quality.

CHICAGO

Buying Interest Still Slow but Prices Being Maintained. Feed Materials Not Plentiful.

Exclusive Correspondence to "The American Fertilizer."

CHICAGO, January 15, 1940.

No buying interest in organics has as yet occurred. Meanwhile the market, though inactive, is held fairly firm. It is sellers' opinion that as soon as the southern season develops, need for additional material will become manifest. It is worthy of note that steamed bone meal remains at top prices with no increase in supplies.

The feed market has a slightly mixed appearance, but materials are not plentiful, which enables sellers to maintain their asking prices.

Nominal prices are as follows: High-grade ground fertilizer tankage, \$3.25 to \$3.50 (\$3.95 to \$4.25½ per unit N) and 10 cents; standard grades crushed feeding tankage, \$3.90 to \$4.00 (4.74 to \$4.86) and 10 cents; blood, \$3.80 to \$3.85 (\$4.62 to \$4.68 per unit N); dry rendered tankage, 77 to 85 cents per unit of protein, Chicago basis.

PHILADELPHIA

Market Stiffened Slightly. Deliveries Heavier in Some Materials.

Exclusive Correspondence to "The American Fertilizer."

PHILADELPHIA, January 16, 1940.

The fertilizer materials market stiffened slightly during the past week. More interest was shown in offerings and deliveries on contracts were heavier.

Nitrate of Soda.—Deliveries light. Price remains \$27.00 in bulk with usual differential in 200-lb. bags and 100-lb. bags.

Sulphate of Ammonia.—Deliveries against contracts heavy. Price remains \$28.00, port basis.

Dried Blood.—Not much interest being shown in offerings of this material at \$3.40 to \$3.45 per unit of ammonia (\$4.13½ to \$4.19½ per unit N).

Tankage.—Quoted at \$3.50 per unit of am-

monia (\$4.25½ per unit N) and 10 cents per unit of B. P. L.

Bone Meal.—3 and 50 per cent quoted at \$32.00 to \$33.00; 4½ and 45 per cent at \$35.00.

Superphosphate.—Quiet. Price remains firm.

COTTONSEED MEAL PRODUCTION DROPS

The U. S. Bureau of the Census reports that the receipts of cottonseed during the period from September 1, to December 31, 1939 totaled 3,580,735 tons as compared with 3,657,889 tons during the same months of 1938. During the same period, the production of cottonseed meal amounted to 1,138,016 tons, with shipments of 1,037,940 tons and a supply on hand, December 31st, of 219,794 tons. This latter figure is considerably smaller than that of December 31, 1938 when stocks on hand amounted to 312,810 tons.

CLASSIFIED ADVERTISEMENTS

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ONE second-hand Stedman 40-in. cage-type disintegrator. Friction babbit bearings. Price: \$150.00 net/cash. Address "450," care THE AMERICAN FERTILIZER, Philadelphia.

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ONE Pratt mixing pan, complete; this includes pan, base, bottom, top, ring gear, dust hopper, scale, gears and gearing. The bottom, pan, ring gear and base were bought new in 1937 and are now in perfect order. Price reasonable. Apply MERCHANTS FERTILIZER COMPANY.

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See Page 4

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New York City

TRONA

MENTION "THE AMERICAN FERTILIZER" WHEN WRITING TO ADVERTISERS.

The Fertilizer Outlook for 1940*

By T. E. Milliman

Farmers in 1940, in spite of the European war, need not expect sharp increases in fertilizer prices.

Many will remember the course of fertilizer prices in the first World War, when in 1917 wholesale prices of nitrate of soda jumped to \$97.70 a ton, sulphate of ammonia to \$99.00, muriate of potash to \$437.50, and 20 per cent superphosphate to \$22.75 a ton at Atlantic port plants, without bags. On 20 per cent superphosphate the farm price was not less than \$30.00, a high price certainly, but one which reflected much less increase than occurred on other fertilizer materials, because America was self-sufficient on superphosphate only.

Today twenty-three years later, the nitrogen sources available to American farmers, industry, and our government munitions, have been greatly enlarged. We have still available all the Chilean nitrate that may be needed, with an uninterrupted access by sea to the coast of Chile via Panama Canal. We have also an enlarged capacity for the production of by-product sulphate of ammonia to the extent that the size and numbers of steel mills, and illuminating gas plants have been increased.

The most significant change in the national nitrogen situation has been brought about by the development of three enormous plants for the fixation of atmospheric nitrogen. The largest of these is in Tidewater, Virginia, another is in the mountains of West Virginia, close to coal, and the third is at Niagara Falls, Ontario, where advantage is taken of low rates for the use of electric power. The combined productive capacity of these plants when added to the nitrogen sources referred to as being available to us in the last war, adds up to a figure in excess of our national needs, even in the face of a possibly active munitions market. Nitrogen should go up in price very little in the next six months, and is now at prices of a year ago.

Phosphorous, or superphosphate as we know it, is found more abundantly in America than elsewhere in the world. The ability of the phosphate mines of Florida and Tennessee to produce the raw phosphate rocks, and of our exceedingly numerous acidulating plants to convert rocks into superphosphate by the use of sulphuric acid, far outstrips any de-

mand that the farmers of this country have ever made. The national productive capacity on sulphuric acid has also been stepped up considerably in recent years. Superphosphate may, however, cost about 5 to 7 per cent more in 1940 because of sharply increased ocean freight rates on phosphate rock from the loading ports at Tampa and Boca Grande, Florida, to the Atlantic ports of Baltimore, Philadelphia, New York and Boston, from which northeastern farmers get their superphosphate. The increased ocean freights also affect sulphur, which is moved from Texas ports on the Gulf Coast to the same northern ports and is there converted into sulphuric acid. Slight upward influences on superphosphate costs are also traceable to the increased value of the oil and the Negro labor used in phosphate rock mining.

Potash went sky high in the last war because Germany had about all of it. Farmers use close to 100 per cent of the potash produced, and need not be worried about the price of it in this war. The lack of the need to worry is traceable to two situations, the lesser one being the return of the potash producing Province of Alsace to France at the Treaty of Versailles. France now has about 30 per cent of the potash of Europe and is located far enough south of the North Sea to permit Transatlantic movement of ships with reasonable safety. French potash continues to be received in this country.

Of much greater significance to the farmers of U. S. A., however, is the rapid and continuous development of our own potash deposits which are very large. The earliest of these to be opened is the so-called Trona Bed, consisting of a brine lake heavy in potash and borax, in a desert region of southern California. Two actual mines, where rich potash ore is

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taken out at the 1,000 foot level, are now in operation in the semi-arid cattle country at Carlsbad, in southwestern New Mexico. A third production at Carlsbad is about ready. Both the New Mexican and California grades of refined potash are fully equal, chemically, physically, and in crop producing power, to the best French or German goods. American production now accounts for about two-thirds of national consumption; and there is no fear of a shortage, or need for increased costs of production, if any.

Fertilizer prices will be moderate for spring, 1940. Fertilizer is one of the cheapest and most result-getting commodities farmers can buy.

ONTARIO FERTILIZER BOOKLET

Through the courtesy of Professor Henry G. Bell, of the Ontario Agricultural College, we have received a copy of a recent booklet entitled, "Recommendations for Soil Management and Use of Fertilizer under War Emergency Conditions," issued by the Advisory Fertilizer Board for Ontario. The booklet contains recommendations for the analyses and amounts of fertilizer to be used for more than a score of crops grown in the Province. It is interesting to note that only 15 different analyses are able to supply all the requirements for mixed fertilizers. Advice is also given on methods of application, and a section is devoted to soil analysis.

FERTILIZER SELLERS IN GERMANY PROTECTED BY CROP LIENS

The practice that has been in vogue for several years in Germany of granting sellers of commercial fertilizers and seeds prior liens upon farmers' crops as guarantees of payment for material sold on a credit basis has been extended for the 1940 season.

Germany's consumption of commercial fertilizer has expanded markedly in the last 6 years. However, owing to the shortage of requisite raw material, or utilization of national productive capacity, it has been found necessary to institute restrictions upon the use of nitrogenous and phosphatic fertilizers, since the beginning of the present war. Consumption of phosphatic fertilizers has been drastically reduced to only 40 per cent of the levels of 1937-38, owing to insufficient supplies of imported crude phosphate and basic phosphate slag. Consumption of nitrogenous fertilizer was

reduced less markedly, or to 75 per cent of the national consumption in 1938-39.

Having in view Germany's immense capacity for producing synthetic nitrogen, the fact that it was found necessary to impose any restrictions at all upon consumption of nitrogen for fertilizer purposes, suggests the extent to which the synthetic nitrogen industry is being called upon for producing nitrogen for non-fertilizer purposes.

SELECTED EDITORIALS FROM LINK-BELT NEWS

Published in the belief that there is more to business than just selling goods, Link-Belt Company has issued a 64-page book of Selected Editorials from Link-Belt News, its monthly publication which circulates throughout the industries to the extent of about 130,000 names each month.

These editorials, of broad general interest and mostly of a philosophical, inspirational nature, were, in the main, written by prominent authors and first appeared in well-known magazines or newspapers, having later been reprinted in the News by special permission. The editorials selected are those on which the company is said to have received a great many favorable comments.

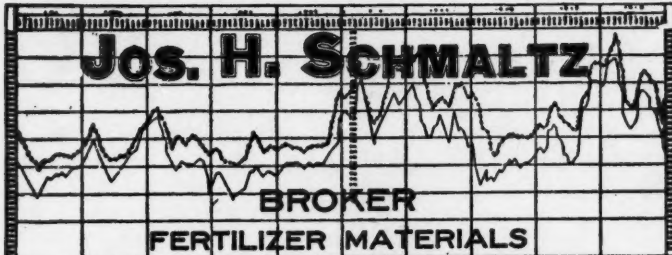
Another reason given for the book is the fact that readers had made requests from time to time for additional copies of individual editorials, moreover expressing the wish that copies of all of them might be obtained in the form of a convenient pocket-size book like Readers' Digest.

A copy will be sent free to any interested reader, upon request, addressed to Link-Belt Company, 307 N. Michigan Avenue, Chicago.

MANGANESE SULPHATE PRICES ANNOUNCED

The Harshaw Chemical Company, Cleveland, Ohio, has announced current prices on its fertilizer grade of manganese sulphate "Techmangam." In carload lots, the quotation is \$52.00 per ton of 2,000 lb., in 100-lb. bags, f.o.b. Kingsport, Tenn., with freight allowed to destination in the Southern Freight Association territory, with special quotations to other destinations. On less-than-carload orders, the price is 3 cents per pound on 5 tons or more, and 3½ cents per lb. on smaller quantities, f.o.b. Kingsport, Tenn., Philadelphia, Pa., or Cleveland, Ohio. As "Techmangam" analyzes 65 per cent soluble $MnSO_4$, the carload price is equivalent to 80 cents per unit of $MnSO_4$.

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DR. BEAR HEADS NEW JERSEY SOILS DEPARTMENT

Dr. Robert C. Clothier, President Rutgers University, has announced the appointment of Dr. Firman E. Bear as Head of the Soils Department of the College of Agriculture and Experiment Station. Dr. William H. Martin, Dean and Director of the Agricultural College and Experiment Station, stated: "Doctor Bear has had broad experience as a research worker and teacher in his chosen field and is exceptionally well versed in the programs and personnel of soil science departments in experiment stations and commercial organizations throughout the land. I am confident that under his leadership, our Soils Department will maintain the high standards of service which it achieved under Dr. Jacob G. Lipman and Prof. A. W. Blair."

Doctor Bear was born on an Ohio farm which he has owned and operated for the past 20 years. He is a graduate of Ohio State University and received his Doctor's degree at the University of Wisconsin. He was Head of the Department of Soils at Ohio State University for 12 years, was for 8 years Director of Agricultural Research for the American Cyanamid Company, and for the past 2 years has been Science Editor of "The Country Home" magazine. He is the author of two widely used textbooks, "Theory and Practice in the Use of Fertilizers" and "Soil Management." His many friends in the fertilizer industry will be glad to learn of his appointment.

FERTILIZER RATIONING SYSTEM ESTABLISHED IN THE NETHERLANDS

Ration order of October 7, 1939, provides that artificial fertilizers in any form, but not including lime, may not be purchased, sold, delivered or kept in stock in the Netherlands except under certain prescribed conditions. The general trade in fertilizers is restricted to firms or individuals registered with the Fertilizer Bureau and consumers are restricted to purchases for their own consumption. Registered firms or individuals must provide on the 13th and 18th day of each month a statement of available stocks. Consumers of fertilizers are supplied by the Fertilizer Bureau with coupons which must be picked up by dealers at time of delivery, the dealer

in turn returning the coupon to the Fertilizer Bureau with the periodical statement of available stocks. (Office of the American Commercial Attache, the Hague.)

THE SOUTH'S CHANGING AGRICULTURE

(Continued from page 7)

lizer consumption. In this part of the nation, which leads all others in fertilizer consumption, cotton as a source of income has in the past so outshadowed all others that the less important income-producing enterprises have been neglected. This cannot be true of the farming operation of today and tomorrow. Every enterprise must be handled in the most efficient manner possible.

All business must make adjustments. This truism applies to the fertilizer industry as it does to all others. As I see the present situation in the changing agriculture of the South, it becomes the duty of the makers and salesmen of commercial fertilizers to present to the farmers of the region facts that will show how applications of plant food will pay dividends when applied to crops other than cotton.

In the South we must never lose sight of the fact that we have relatively more people and less land than any other major farming area of the nation. This means that we must learn to use our land as wisely as the nations of Europe and Asia, where there is an immense pressure of population upon the land. This fact is not appreciated by the people who live in the South. They do not seem to realize that the low income of the farm people of the section is due to a greater extent to the limited number of acres of cropland per person than to any other single factor in our agricultural situation. The most promising way in which this situation can be corrected is to increase the returns from each acre of available land. Maximum production cannot be attained without a substantial increase in the application of commercial plant food per acre. This is understood by the workers in the experiment stations of the South. There is not a state, I believe, that today uses as much fertilizer per acre as is recommended as the optimum application by its experiment station.

In the changing agriculture of the South, the fertilizer industry has an important part to play. It is an essential industry that is destined to become more important with the passing of the years.

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the number of pounds of raw material for a desired per cent. of plant food in a ton of mixed goods—or find what per cent. of a certain plant food in a ton of fertilizer produced by a specific quantity of raw materials.

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BUYERS' GUIDE

A CLASSIFIED INDEX TO ALL THE ADVERTISERS IN "THE AMERICAN FERTILIZER"



This list contains representative concerns in the Commercial Fertilizer Industry, including fertilizer manufacturers, machinery and equipment manufacturers, dealers in and manufacturers of commercial fertilizer materials and supplies, brokers, chemists, etc.
For Alphabetical List of Advertisers, see page 83.



ACID BRICK

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

ACID EGGS

Chemical Construction Corp., New York City.

ACIDULATING UNITS

Chemical Construction Corp., New York City.

AMMO-PHOS

American Cyanamid Co., New York City.

AMMONIA—Anhydrous

Barrett Company, The, New York City.
Du Pont de Nemours & Co., E. I., Wilmington, Del.
Hydrocarbon Products Co., New York City.

AMMONIA LIQUOR

Barrett Company, The, New York City.
Du Pont de Nemours & Co., E. I., Wilmington, Del.
Hydrocarbon Products Co., New York City.

AMMONIA OXIDATION UNITS

Chemical Construction Corp., New York City.

AMMONIATING EQUIPMENT

Sackett & Sons Co., The A. J., Baltimore, Md.

APPARATUS—Laboratory

Sturtevant Mill Co., Boston, Mass.

AUTOMATIC ELEVATOR TAKEUPS

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

BABBITT

Sackett & Sons Co., The A. J., Baltimore, Md.

BAGS AND BAGGING—Manufacturers

Bagpak, Inc., New York City.
Bemis Bro. Bag Co., St. Louis, Mo.
Fulton Bag & Cotton Mills, Atlanta, Ga.

BAGS—Cotton

Bemis Bro. Bag Co., St. Louis, Mo.
Fulton Bag & Cotton Mills, Atlanta, Ga.

BAGS—Paper

Bagpak, Inc., New York City.
Bemis Bro. Bag Co., St. Louis, Mo.

BAGS (Waterproof)—Manufacturers

Bemis Bro. Bag Co., St. Louis, Mo.
Fulton Bag & Cotton Mills, Atlanta, Ga.

BAGS—Dealers and Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

BAGGING MACHINES—For Filling Sacks

Atlanta Utility Works, East Point, Ga.
Bagpak, Inc., New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Co., Boston, Mass.

BAG-CLOSING MACHINES

Bagpak, Inc., New York City.

BAG FILERS

Link-Belt Company, Philadelphia, Chicago.

BEARINGS

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

BELT LACING

Flexible Steel Lacing Co., Chicago, Ill.

BELTING—Chain

Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

BELTING—Leather, Rubber, Canvas

Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Co., Boston, Mass.

BOILERS—Steam

Atlanta Utility Works, East Point, Ga.

BONE BLACK

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Huber & Company, New York City.

BONE PRODUCTS

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

BORAX AND BORIC ACID

American Potash and Chem. Corp., New York City.
Pacific Coast Borax Co., New York City.

BROKERS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Burns & Company, L. D., Atlanta, Ga.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Keim, Samuel L., Philadelphia, Pa.
Schmaltz, Jos. H., Chicago, Ill.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

BUCKETS—Elevator

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

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Menhaden Fish Products
and
Fertilizer Materials

A Classified Index to Advertisers in
"The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the
Advertisers, see page 25

BUCKETS—For Hoists, Cranes, etc., Clam Shell, Orange
Peel, Drag line, Special; Electrically Operated and
Multi Power

Hayward Company, The, New York City.

Link-Belt Company, Philadelphia, Chicago.

BURNERS—Sulphur

Chemical Construction Corp., New York City.

BURNERS—Oil

Monarch Mfg. Works, Inc., Philadelphia, Pa.

CABLEWAYS

Hayward Company, The, New York City.

CALCIUM-NITRATE

Synthetic Nitrogen Products Co., New York City.

CAL-NITRO

Synthetic Nitrogen Products Co., New York City.

CARBONATE OF AMMONIA

American Agricultural Chemical Co., New York City.

Du Pont de Nemours & Co., E. I., Wilmington, Del.

CARS—For Moving Materials

Link-Belt Company, Philadelphia, Chicago.

Stedman's Foundry and Mach. Works, Aurora, Ind.

CARTS—Fertilizer, Standard and Roller Bearing

Atlanta Utility Works, East Point, Ga.

CASTINGS—Acid Resisting

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

Duriron Co., Inc., The, Dayton, Ohio.

CASTINGS—Iron and Steel

Link-Belt Company, Philadelphia, Chicago.

Sackett & Sons Co., The A. J., Baltimore, Md.

Stedman's Foundry and Mach. Works, Aurora, Ind.

CEMENT—Acid-Proof

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

Chemical Construction Corp., New York City.

CHAIN DRIVES—Silent

Link-Belt Company, Philadelphia, Chicago.

Stedman's Foundry and Mach. Works, Aurora, Ind.

CHAINS AND SPROCKETS

Jeffrey Mfg. Co., Columbus, Ohio.

Link-Belt Company, Philadelphia, Chicago.

Sackett & Sons Co., The A. J., Baltimore, Md.

Stedman's Foundry and Mach. Works, Aurora, Ind.

CHAMBERS—Acid

Chemical Construction Corp., New York City.

Fairlie, Andrew M., Atlanta, Ga.

CHEMICAL APPARATUS

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

Duriron Co., Inc., The, Dayton, Ohio.

Monarch Mfg. Works, Inc., Philadelphia, Pa.

CHEMICALS

American Agricultural Chemical Co., New York City.

American Cyanamid Co., New York City.

Armour Fertilizer Works, Atlanta, Ga.

Ashcraft-Wilkinson Co., Atlanta, Ga.

Baker & Bro., H. J., New York City.

Barrett Company, The, New York City.

Bradley & Baker, New York City.

Du Pont de Nemours & Co., E. I., Wilmington, Del.

CHEMICALS—Continued

Huber & Company, New York City.

Wellmann, William E., Baltimore, Md.

CHEMICAL PLANT CONSTRUCTION

Atlanta Utility Works, East Point, Ga.

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

Chemical Construction Corp., New York City.

Fairlie, Andrew M., Atlanta, Ga.

Sackett & Sons Co., The A. J., Baltimore, Md.

Stedman's Foundry and Mach. Works, Aurora, Ind.

Sturtevant Mill Co., Boston, Mass.

CHEMISTS AND ASSAYERS

Gascoyne & Co., Baltimore, Md.

Morris Testing Laboratories, Macon, Ga.

Shuey & Co., Savannah, Ga.

Stillwell & Gladding, New York City.

Wiley & Company, Baltimore, Md.

CLUTCHES

Chain Belt Company, Milwaukee, Wis.

Link-Belt Company, Philadelphia, Chicago.

Sackett & Sons Co., The A. J., Baltimore, Md.

Stedman's Foundry and Mach. Works, Aurora, Ind.

CONCENTRATORS—Sulphuric Acid

Chemical Construction Corp., New York City.

Fairlie, Andrew M., Atlanta, Ga.

CONDITIONERS AND FILTERS

American Limestone Co., Knoxville, Tenn.

Burns & Company, L. D., Atlanta, Ga.

CONTACT ACID PLANTS

Chemical Construction Corp., New York City.

COTTONSEED PRODUCTS

Ashcraft-Wilkinson Co., Atlanta, Ga.

Baker & Bro., H. J., New York City.

Bradley & Baker, New York City.

Burns & Company, L. D., Atlanta, Ga.

Huber & Company, New York City.

Jett, Joseph C., Norfolk, Va.

Schmalts, Jos. H., Chicago, Ill.

Taylor, Henry L., Wilmington, N. C.

Wellmann, William E., Baltimore, Md.

CRANES AND DERRICKS

Hayward Company, The, New York City.

Link-Belt Company, Philadelphia, Chicago.

Link-Belt Speeder Corp., Chicago, Ill. and Cedar

Rapids, Iowa.

CYANAMID

American Agricultural Chemical Co., New York City.

American Cyanamid Co., New York City.

Ashcraft-Wilkinson Co., Atlanta, Ga.

Baker & Bro., H. J., New York City.

Bradley & Baker, New York City.

Jett, Joseph C., Norfolk, Va.

Taylor, Henry L., Wilmington, N. C.

Wellmann, William E., Baltimore, Md.

DENS—Superphosphate

Chemical Construction Corp., New York City.

Stedman's Foundry and Mach. Works, Aurora, Ind.

Sturtevant Mill Co., Boston, Mass.

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CHEMICAL ENGINEER

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Cooled Acid Chambers, Gaillard Acid-Cooled Chambers,
Gaillard Acid Dispersers, Contact Process Sulphuric
Acid Plants.**

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BUYERS' GUIDE

For an Alphabetical List of all the
Advertisers, see page 33

DISINTEGRATORS

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

DOUBLE SUPERPHOSPHATE (See Superphosphate—Concentrated)

DRYERS—Direct Heat

Sackett & Sons Co., The A. J., Baltimore, Md.

DRIVES—Electric

Link-Belt Company, Philadelphia, Chicago.

DUMP CARS

Link-Belt Company, Philadelphia, Chicago.
Stedman's Foundry and Mach. Works, Aurora, Ind.

DUST COLLECTING SYSTEMS

Sturtevant Mill Co., Boston, Mass.

ELECTRIC MOTORS AND APPLIANCES

Atlanta Utility Works, East Point, Ga.

ELEVATORS

Atlanta Utility Works, East Point, Ga.
Jeffrey Mfg. Co., Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

ELEVATORS AND CONVEYORS—Portable

Link-Belt Company, Philadelphia, Chicago.
Sturtevant Mill Co., Boston, Mass.

ENGINEERS—Chemical and Industrial

Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Link-Belt Company, Philadelphia, Chicago.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

ENGINES—Steam

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

EXCAVATORS AND DREDGES—Drag Line and Cableway

Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Link-Belt Speeder Corp., Chicago, Ill. and Cedar Rapids, Iowa.

FERTILIZER MANUFACTURERS

American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Farmers Fertilizer Co., Columbus, Ohio.
International Agricultural Corp., New York City.
Smith-Rowland Co., Norfolk, Va.
U. S. Phosphoric Products Corp., New York City.

FISH SCRAP AND OIL

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Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Burns & Company, L. D., Atlanta, Ga.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

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Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GARBAGE TANKAGE

Wellmann, William E., Baltimore, Md.

GEARS—Machine Moulded and Cut

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Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GEARS—Silent

Link-Belt Company, Philadelphia, Chicago.

GELATINE AND GLUE

American Agricultural Chemical Co., New York City.

GUANO

Baker & Bro., H. J., New York City.

HOISTS—Electric, Floor and Cage Operated, Portable

Hayward Company, The, New York City.

HOPPERS

Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

IMPORTERS, EXPORTERS

Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Wellmann, William E., Baltimore, Md.

INSECTICIDES

American Agricultural Chemical Co., New York City.
Burns & Company, L. D., Atlanta, Ga.

LACING—Belt

Flexible Steel Lacing Co., Chicago, Ill.

LIMESTONE

American Agricultural Chemical Co., New York City.
American Limestone Co., Knoxville, Tenn.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Wellmann, William E., Baltimore, Md.

LOADERS—Car and Wagon, for Fertilizers

Link-Belt Company, Philadelphia, Chicago.

MACHINERY—Acid Making

Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.
Duriron Co., Inc., The, Dayton, Ohio.
Fairlie, Andrew M., Atlanta, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Coal and Ash Handling

Hayward Company, The, New York City.
Jeffrey Mfg. Co., Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Elevating and Conveying

Atlanta Utility Works, East Point, Ga.
Hayward Company, The, New York City.
Jeffrey Mfg. Co., Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
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Sturtevant Mill Co., Boston, Mass.

MACHINERY—Power Transmission

Jeffrey Mfg. Co., Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Pumping

Atlanta Utility Works, East Point, Ga.
Duriron Co., Inc., The, Dayton, Ohio.

MACHINERY—Tankage and Fish Scrap

Atlanta Utility Works, East Point, Ga.
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Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MAGNETS

Atlanta Utility Works, East Point, Ga.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MIXERS

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Ransome Concrete Machinery Co., Dunellen, N. J.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

NITRATE OF SODA

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Company, The, New York City.
Bradley & Baker, New York City.
Chilean Nitrate Sales Corp., New York City.
Huber & Company, New York City.
International Agricultural Corp., New York City.
Schmalz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

NITRATE OVENS AND APPARATUS

Chemical Construction Corp., New York City.

NITROGENOUS ORGANIC MATERIAL

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Burns & Company, L. D., Atlanta, Ga.
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Huber & Company, New York City.
International Agricultural Corp., New York City.
Smith-Rowland Co., Norfolk, Va.
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NOZZLES—Spray

Monarch Mfg. Works, Inc., Philadelphia, Pa.

PACKING—For Acid Towers

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

PANS AND POTS

Stedman's Foundry and Mach. Works, Aurora, Ind.

PHOSPHATE MINING PLANTS

Chemical Construction Corp., New York City.

PHOSPHATE ROCK

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American Cyanamid Co., New York City.
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Schmalz, Jos. H., Chicago, Ill.
Southern Phosphate Corp., Baltimore, Md.
Taylor, Henry L., Wilmington, Del.
Wellmann, William E., Baltimore, Md.

PIPE—Acid Resisting

Duriron Co., Inc., The, Dayton, Ohio.

PIPES—Chemical Stoneware

Chemical Construction Corp., New York City.

PIPES—Wooden

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PLANT CONSTRUCTION—Fertilizer and Acid

Chemical Construction Corp., New York City.
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POTASH SALTS—Dealers and Brokers

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
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Taylor, Henry L., Wilmington, Del.
Wellmann, William E., Baltimore, Md.

POTASH SALTS—Manufacturers and Importers

American Potash and Chem. Corp., New York City.
Potash Co. of America, Baltimore, Md.
United States Potash Co., New York City.

PULLEYS AND HANGERS

Atlanta Utility Works, East Point, Ga.
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Sackett & Sons Co., The A. J., Baltimore, Md.
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PUMPS—Acid-Resisting

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

PYRITES—Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.
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Jett, Joseph C., Norfolk, Va.
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QUARTZ

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

RINGS—Sulphuric Acid Tower

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Sturtevant Mill Co., Boston, Mass.

SEPARATORS—Including Vibrating

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Sturtevant Mill Co., Boston, Mass.

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SHOVELS—Power

Link-Belt Company, Philadelphia, Chicago.
Link-Belt Speeder Corp., Chicago, Ill. and Cedar
Rapids, Iowa.

SPRAYS—Acid Chambers

Monarch Mfg. Works, Inc., Philadelphia, Pa.

SPROCKET WHEELS (See Chains and Sprockets)

STACKS

Sackett & Sons Co., The A. J., Baltimore, Md.

SULPHATE OF AMMONIA

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Company, The, New York City.
Bradley & Baker, New York City.
Burns & Company, L. D., Atlanta, Ga.
Huber & Company, New York City.
Hydrocarbon Products Co., New York City.
Jett, Joseph C., Norfolk, Va.
Schmalts, Jos. H., Chicago, Ill.
Synthetic Nitrogen Products Co., New York City.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

SULPHUR

Ashcraft-Wilkinson Co., Atlanta, Ga.
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Texas Gulf Sulphur Co., New York City.

SULPHURIC ACID

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Huber & Company, New York City.

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Jett, Joseph C., Norfolk, Va.
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American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
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Bradley & Baker, New York City.
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Huber & Company, New York City.
International Agricultural Corp., New York City.
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Victor Chemical Works, Chicago, Ill.
Wellmann, William E., Baltimore, Md.

SUPERPHOSPHATE—Concentrated

Armour Fertilizer Works, Atlanta, Ga.
International Agricultural Corp., New York City.
U. S. Phosphoric Products Corp., New York City.
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SYPHONS—For Acid

Monarch Mfg. Works, Inc., Philadelphia, Pa.

TALLOW AND GREASE

American Agricultural Chemical Co., New York City.

TANKAGE

American Agricultural Chemical Co., New York City.

TANKS

Armour Fertilizer Works, Atlanta, Ga.
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Baker & Bro., H. J., New York City.
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Jett, Joseph C., Norfolk, Va.
Schmalts, Jos. H., Chicago, Ill.
Smith-Rowland Co., Norfolk, Va.
Taylor, Henry L., Wilmington, N. C.
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TANKAGE—Garbage

Huber & Company, New York City.

TANKS

Sackett & Sons Co., The A. J., Baltimore, Md.

TILE—Acid-Proof

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TOWERS—Acid and Absorption

Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.

UNLOADERS—Car and Boat

Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.

UREA

Du Pont de Nemours & Co., E. I., Wilmington, Del.
Synthetic Nitrogen Products Co., New York City.

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VALVES—Add-Resisting

Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
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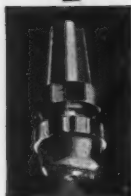
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